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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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EXAMINER

CONNOLLY, PATRICK J

ART UNIT PAPER NUMBER

2877

DATE MAILED: 12/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/053,357

Applicant(s)

SARFATY ET AL.

Examiner

Patrick J Connolly

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 January 2002 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other:

DETAILED ACTION

Claim Objections

Claim 13 is objected to because of the following informalities: dependency is claimed from “claim 14”. The examiner believes that this should be “claim 11”. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 27-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, the use of the limitation “detector” is confusing. It appears that the applicant might be claiming two separate detectors, however given the specification and figures the examiner believes that these detectors are the same, such that the detector in the spectrum analyzer is the same detector that is in optical communication with the lens assembly.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5-10, 20, and 24-28 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent No. 6,081,334 to Grimbergen et al (hereafter Grimbergen).

As to claims 1 and 19, Grimbergen discloses a method for determining characteristics of a film on a wafer in a processing chamber including (see figures 3a, 3b and 6, also column 12, lines 47-54): impinging optical radiation upon said film; sensing optical radiation reflected by said film to form spectral signals containing information concerning interference fringes; and obtaining thickness information of said film as a function of a periodicity of said interference fringes.

As to claim 5 and 6, Grimbergen discloses collecting and collimating cylindrical radiation by means of a lens assembly (see figure 2, 74a, 74b).

As to claim 7, Grimbergen discloses collecting two “bundles of rays” formed by reflections of two interfaces (see figures 4a, 4b, 4c).

As to claim 8, Grimbergen discloses exposing the wafer to plasma (see column 6, lines 36-54).

As to claim 9, Grimbergen discloses exposing the wafer to white light (see column 7, lines 19-36).

As to claim 10, Grimbergen discloses detecting multiple peaks corresponding to thickness (see column 13, 14).

As to claims 20, 27 and 28, Grimbergen discloses an apparatus including (see figure 2):
a processing chamber (42);
a system to generate optical radiation (66, 74a, 74b, 86);
a spectrum analyzer having a detector (70);
a processor in communication with said analyzer(72);

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a memory in communication with said processor, said memory comprising a computer readable medium having a program therein, said program causing a processor to obtain thickness information as a function of interference fringe periodicity (72).

As to claim 24, Grimbergen discloses a plasma generation apparatus (56);

As to claims 25-27, Grimbergen discloses a lens assembly for light collimation and the collection of cylindrical radiation (74a, 74b).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-4, 11, 12-18, 21-23 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grimbergen.

As to claims 2-4, 11-18, 21-23 and 29-31 Grimbergen teaches analyzing the data with respect to wavelength.

With further regard to claims 4, 13, 23 and 31, Grimbergen teaches determining the etch rate of the film with respect to wavelength during an interval of time (see column 9, lines 23-45).

Grimbergen does not teach analyzing the data with respect to the reciprocal of the wavelength domain, or as it is commonly referred to, the frequency domain.

It is notoriously well known in the art that the reciprocal of wavelength is frequency and this relationship is given by the following formula:

$$\lambda = \frac{c}{f}$$

where λ is wavelength, f is frequency, and c is the speed of light.

It would have been obvious to one of ordinary skill in the art at the time of invention to analyze the spectral data with respect to frequency instead of wavelength, as it is often desirable to interpret interferometric data in multiple domains, including both frequency and wavelength domains for purposes of clarity and analysis.

As to the further limitations of claims 11-18, please see the teachings in the rejection of claims 1 and 5-10 above.


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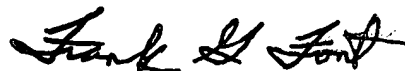
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick J Connolly whose telephone number is 703.305.4397.

The examiner can normally be reached on 9 am-5.30 pm ... Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 703.308.4881. The fax phone number for the organization where this application or proceeding is assigned is 703.872.9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0956.

pjc 



Frank G. Font
Supervisory Patent Examiner
Technology Center 2800